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ABSTRACT

The Arctic National Wildlife Refuge (ANWR) is an area of land located in the northeast corner of Alaska within the Arctic Circle that includes a potentially oil-rich coastal plain between the Beaufort Sea, the Brooks Range, and the Prudhoe Bay oil fields. For the past several years, ANWR has also been the location of a national debate over energy policy. There are known oil reserves beneath the coastal plain. How much oil and how much is readily recoverable are unknowns, but the amount is enough to engage the passionate attention of advocates on both sides of the dispute. The debate is whether to drill in ANWR. This lesson plan asks students to first read an objective article from "The Seattle Times" entitled "Refuge in a Storm" which is provided in a handout and can also be accessed online. Then students discuss the background to the ANWR debate in a small group, identifying supporters and opponents of drilling and areas of dispute. The teacher guide contains a sheet entitled "To Drill or Not To Drill?" which samples various opinions on the question. The guide presents an optional extension assignment for large group discussion about whether the attack on the World Trade Center will change the nation's mind about drilling in ANWR. (BT)

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The Arctic National Wildlife Refuge:
Many Alternatives and One Choice to Make

The Arctic National Wildlife Refuge (ANWR) is an area of land located in the Northeast corner of Alaska within the Arctic Circle that includes a potentially oil-rich coastal plain between the Beaufort Sea, the Brooks Range and the Prudhoe Bay oil fields. For the past several years ANWR has also been the location of our national debate over energy policy. There are known oil reserves beneath the coastal plain; how much oil and how much is readily recoverable are unknowns, but the amount is enough to engage the passionate attention of advocates on both sides of the dispute.

The Eisenhower administration executive order that created the refuge provided for exploration and the eventual discovery of oil deposits, but an act of Congress is necessary before any drilling can take place. Currently a bill to open a portion of ANWR to oil companies has passed the House of Representatives and awaits action by the Senate. To drill or not to drill? It's a significant question that pits our love for wildlife and pristine environment against our desire for a domestic source of energy to enhance national security and support our modern lifestyles. Intense, protracted public and Congressional debate is expected and the outcome is anyone's guess.

Not surprisingly, advocacy on both sides is passionate. Drill or not drill—the alternatives are clear, as is the reality that the necessary to choose one means giving up the benefits inherent in the other. Drill or not drill—give up some degree of unspoiled environment or some quantity of oil and some degree of national independence from foreign oil producers.

Economics recognizes this dilemma, one that scarcity presents us over and over again. We must choose, and in doing so, give up our next-best alternative. Opportunity cost is the term economists use to designate that forgone alternative. In textbook examples—deciding whether to go to the movies or study for a test—choice and opportunity cost may seem simple and clear. In the ANWR debate, the complex list of unknowns and partially-knowns, of clear benefits and potential benefits, makes the drill-or-not-drill choice more difficult. The positions of groups supporting and opposing the opening of ANWR are influenced by their preceptions of benefits, by their knowledge and understanding of the alternatives available for both energy and wildlife preservation, and by their personal values and the values of the organizations that speak for them.

Not surprisingly, the writing and rhetoric of those involved in the drill-or-not-drill debate is often passionate, each side filtering the data (and lack of data) through its own values. Before hearing from the opposing sides themselves, it is useful to try to get a sense of the larger picture. A May 20, 2001, article in *The Seattle Times*, "Refuge in a storm: Nature lovers and oil drillers clash-with little room for compromise" offers a reasonably objective overview. Read the article from the handout provided by your teacher, or access it online in the computer lab or at home: http://archives.seattletimes.nwsource.com/cgi-bin/texis/web/vortex/display?slug=arctic1&date=20010520&query=anwr

After reading *The Seattle Times* article, discuss the background to the ANWR debate in your small group. Make sure that you can identify:

- the supporters of drilling and the reasons for their support;
- the opponents of drilling and the reasons for their opposition;
- the areas of disputed data or information; and

- the areas of undisputed data or information.

Read the "To Drill or Not to Drill?" handout. It contains excerpts from the websites of a number of organizations offering information on the issues. Remember that these organizations are not disinterested observers; on both sides, they are lobbying the public and our elected officials to support their positions. As you read the excerpts consider the following questions and be prepared to answer them when your discussion group reconvenes:

1. What are the benefits identified by those who support drilling?
   - 1A. Do the opponents of drilling agree that any of these benefits exist?
2. What are the benefits identified by those who support <u>not</u> drilling?
   - 2A. Do the supporters of drilling agree that any of these benefits exist?
3. What is the opportunity cost of drilling? (What benefits must be foregone?)
   - 3A. How does each side value those foregone benefits?
4. What is the opportunity cost of <u>not</u> drilling? (What benefits must be foregone?)
   - 4A. How does each side value those foregone benefits?
5. How much of this dispute lies in a disagreement over the benefits of the alternatives and how much in the subjective valuation of those benefits?
6. Do you think that better information (knowing, for example, how much oil is available or exactly what the impact on the caribou herd would be) would resolve the dispute? Why or why not?

To Drill or Not To Drill?

Don't Drill	*Drill*
Natural Resources Defense Council **Website** www.nrdc.org/land/wilderness/arctic.asp The Arctic Refuge, known as "America's Serengeti," is among the world's last truly pristine wild places and one of the largest sanctuaries for Arctic animals on the planet. The coastal plain of the refuge is traversed by a dozen rivers and framed by the jagged peaks of spectacular mountains. This spectacular wilderness is a vital birtning ground for polar bears, grizzlies, Arctic wolves, the vast Porcupine herd of 130,000 caribou and the highly endangered shaggy musk ox… What *would* America gain by opening the refuge to oil activities? Very little. Oil from the Arctic Refuge will not mitigate the crisis in California, bring down gasoline or natural gas prices, or reduce America's dependence on foreign oil. To see what oil activities bode for this pristine sanctuary, just look 60 miles west of the Arctic Refuge to Prudhoe Bay – a gargantuan oil complex that has turned 1,000 square miles of fragile tundra into a sprawling industrial zone containing 1,500 miles of roads and pipelines, 1400 producing wells and 3 jetports. **"Artic National Wildlife Refuge"** **Sierra Club** **Website** www.sierraclub.org/wildlands/arctic/oil.asp Today, oil industry lobbyists persistently press awmakers to open the coastal plain to oil and gas drilling – despite indisputable proof that oil drilling irreparably damages the fragile tundra and its wildlife. At Prudhoe Bay, home to one of the world's largest industrial complexes, 43,000 tons of nitrogen oxides pollute the air each year. Hundreds of spills involving tens of thousands of gallons of crude oil and other petroleum products occur annually. The most optimistic estimates of commercially recoverable oil from the coastal plain would yield only about six months' worth of oil for the US. We wouldn't flood the Grand Canyon to build a hydroelectric dam. We wouldn't plug Yellowstone's Old Faithful to tap its geothermal energy. Why should we permanently destroy this unique wilderness for an unnecessary and uncertain amount of oil?	***The Heritage Foundation*** ***"Time To Permit Oil Drilling In The Arctic Refuge"*** ***By John Shanahan*** ***Website*** *www.heritage.org/library/categories/enviro/em432.html* *Contrary to the image evoked by opponents of oil production, that ANWR is the last small pristine area left in Alaska, the state has an abundance of hardy ecosystems. In addition to the healthy ecosystems existing on millions of acres of private and state land, the Alaska National Interest Lands Conservation Act of 1980 set aside 100 million acres of land as parks, refuges and preserves, including 57 million acres of wilderness.* *…only a tiny fraction – far less than one percent – of the Coastal Plain area would be affected. Advancing technology over the last 20 years has reduced the necessary "footprint" of drilling operations to less than one-fifth of what was required say, at Prudhoe Bay. So exploration and production would affect only about 2,000 acres. To put this in perspective, that is an area about one-sixth the size of Dulles Airport near Washington, D.C., and about 0.01 percent of the total area of ANWR.* *Expanded oil production is badly needed. The United States currently imports more than half its oil consumption, and reliance on foreign oil is growing. That raises national security concerns and is an unwelcome factor in foreign policy considerations. This reliance caused a $51 billion oil trade deficit last year – roughly equivalent to the U.S. trade deficit with Japan.* *Not only will Alaskans and the federal treasury benefit from increased oil production, but an estimated 222,000-732,000 jobs will be created throughout the country. There will be new hires in the oil industry and manufacturers, suppliers, and transporters of oil-related equipment will increase hiring dramatically, with fully 98 percent of these in the lower 48 states.* *As Inupiat Mayor George Ahmagak of the North slope Borough wrote last June. "Our whalers and hunters make maximum use of our few resources, always taking care not to harm the land so their grandchildren may in turn carry on their culture…As mayor, I can state unequivocally that the people of the North Slope Borough enthusiastically support the presence of the oil industry in our land."* *The facts are clear. Permitting oil production in ANWR*

Protect the Arctic from Oil Drilling **Audubon Society** **Website** www.protectthearctic.com/history.asp The coastal plain of the Arctic Refuge lies on Alaska's north coast between the Beaufort Sea, the Brooks Range and the Prudhoe Bay oil fields. Already, 95 percent of Alaska's North Slope is open to drilling. The 110-mile coastal plain – the most biologically productive area and the center of wildlife activity on the Refuge – represents the last remnant of the North Slope closed to development, for now. Despite impressive technological advances, even "responsible" drilling cannot mitigate the noise from traffic and facilities, the extraction of gravel, water loss, and the blockage of water flow, snow laced with metals such as zinc and lead, and air pollution. Yearly emissions of air pollutants on the North Slope include at least 4,000 tons of hydrocarbons, more than 600 tons of methane gas, and 6,000 to 27,000 tons of nitrogen oxide – as much as in Washington D.C The United States consumes 26 percent of the world's oil. Considering that by the most optimistic figures, the Arctic Refuge will yield only 0.4 percent of the world's known oil reserves, Arctic oil will not significantly decrease our dependence on foreign oil. Simply raising the corporate average fuel economy (CAFÉ) standard for new cars by ten miles per gallon would save more oil in one year than all the commercially recoverable oil estimated to be found in the fragile coastal plain. Instead of feeding our national addiction to oil, a strong national energy policy must work towards energy efficiency and conservation.	*would spur economic growth, cut the trade deficit, and ease national security concerns.* ***ANWR Information Brief "Myths of ANWR "*** ***Arctic Power*** ***Website*** *www.anwr.org* *With the exception of the area between the Colville and Canning Rivers (which is owned by the state of Alaska) none of the more than 1,000 mile Arctic Alaska coastline is open to oil and gas leasing, not one mile of it.* *A 200 day supply of oil is almost 4 billion barrels. The coastal plain probably contains much more oil, but it can be produced at a maximum rate of 2 million barrels per day (capacity of the trans-Alaska oil pipeline). There it could last for 25 years and probably much longer.* *Myth: The Coastal Plain is unspoiled wilderness, and Arctic Serengeti.* *Reality: This in no Serengeti. The coastal plain is a frozen, barren land for 9 months of the year. The Inupiat people have lived and hunted there for centuries: 19th century whalers hunted extensively for food; military and defense contractors build DEWline radar sites; recreation groups use it for rafting and hiking. Other areas of the North Slope are more biologically sensitive than the Coastal Plain.* ***The Caribou and Alaskan Oil*** ***Deborah Jacobs*** ***PERC REPORTS Vol.19 Number 2 June 2001*** ***Website*** *www.PERC.ORG* *Oil exploration since 1968 around Prudhoe Bay on the North Slope does not seem to have negatively affected the Central Arctic caribou hear.* *In terms of overall health, the Central Arctic herd has prospered. In 1972, according to the Alaska Department of Fish and Game, the herd numbered 3,000 animals. Since then it has increased to between 25,000 and 27,000.* *The weight of evidence suggests that the oil facilities built in the 1960s have not visibly harmed the caribou that migrate through the Prudhoe Bay area.*

Teacher notes:

This assignment can be given as a homework assignment or in class. The questions can be used as individual written work or as group discussion questions. Suggested answers to the questions are listed below.

Optional Extension - Large Group Discussion:

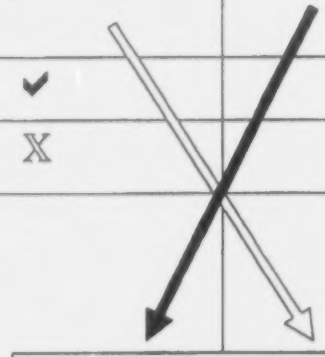
Did the attack on the World Trade Center on September 11th and the nation's response change the opportunity cost of drilling in ANWR? Why or Why not?

Suggested Answers:

The answers to the questions regarding benefits and foregone benefits of the two alternatives can be presented visually in the following chart.

1. What are the benefits identified by those who support drilling?

Alternatives	Drill	Not Drill
Benefits	Increased domestic oil supply (and less dependence on foreign oil) Improve balance of international trade Increase employment in Alaska and other states	Leave the environment in a more pristine condition Protect wild birds and animals, particularly the caribou, wolves and musk ox
Choice	✔	X
Opp cost	X	✔
Benefits refused or foregone		



Note that the benefits of the refused alternative become the foregone alternatives of the opportunity cost

1. Answer: See chart

1A. Do the opponents of drilling agree that any of these benefits exist?
While there is some debate as to how much oil is recoverable, both sides of the issue acknowledge that there is oil in the Refuge. However, an increased domestic oil supply is not necessarily see as a benefit to all groups debating the issue.

2. What are the benefits identified by those who support not drilling?

See Chart

2A. Do the supporters of drilling agree that any of these benefits exist?
Proponents of drilling acknowledge the unique environmental characteristics of ANWR and believe that the impact on these would be relatively small.

3. What is the opportunity cost of drilling? (What benefits must be foregone?)
It is the benefits associated with the foregone alternative. This can be shown visually on the chart by moving the benefits of not drilling into the lower left box.(blue arrow)

3A. How does each side value those foregone benefits?
The simplest answer to this is; differently! However, the debate really centers on the perceived degree of the opportunity cost. Those in favor of drilling believe that there is evidence that shows that we would give up little in terms of wildlife and pristine environment because such a small area would be affected due to improved drilling technology. On the other hand, those in favor of not drilling believe there is evidence that the amount of oil to be potentially recovered is small compared to U.S. demand and thus of relatively little benefit.

4. What is the opportunity cost of not drilling? (What benefits must be foregone?)
It is the benefits associated with the foregone alternative, drilling. This can be shown visually on the chart by moving the benefits of drilling into the lower right box. (red arrow)

4A. How does each side value those foregone benefits?
See answer 3A

5. How much of this dispute lies in a disagreement over the benefits of the alternatives and how much in the subjective valuation of those benefits?
There is some disagreement over the facts of the dispute: projected damage to the caribou herd; levels of air pollution; amount of recoverable oil; numbers of jobs created etc., but both sides acknowledge that there are benefits associated with the other alternative. However, the value of the forgone benefits in this decision is very much dependent on the personal values held by the individuals on each side of the debate. While everyone can agree that a pristine environment is worth something, there is no way to put a precise value on it other than to look at what we are willing to give up in order to have it—in this case some level of oil production. Oil production can be measured in dollar value based on current or forecast prices, but the debate here is not so much on the dollar value of the potential production as it is on the need to have increased assurance of a domestic supply of oil. Again, many factors will influence what each individual subjectively feels about the need for increased domestic supplies of oil. We can only judge the value of the drilling for the domestic supply based on what we are willing to give up to get it.

6. Do you think that better information (knowing, for example, how much oil is available or exactly what the impact on the caribou herd would be) would resolve the dispute? Why or why not?

It's possible that better data would clarify the opportunity costs, (the forgone benefits) and thereby change some individual's position on the choice. However, the subjective valuation of the importance of domestic energy supplies versus the calving rate of caribou, for example, will probably not be changed by improved data. Consequently the debate is likely to continue unresolved even if better information is made available.

Optional Extension - Large Group Discussion:

Did the attack on the World Trade Center on September 11th and the nation's response change the opportunity cost of drilling in ANWR? Why or Why not?

If the attack and the U.S. response has changed

- *available alternatives,*
- *the perceived cost of using foreign oil, or*
- *the values of individuals regarding the environment or oil production,*

then the opportunity cost has changed. It is important that the class understand that the events of September 11, 2001 have not changed the environmental realities of this question; the caribou and the oil deposits are still there. What has perhaps changed is perception and valuation of the opportunity costs. If we can trust the impression we get from media reporting, for many people, the renewed awareness of the necessity for oil for national defense has increased the value they place on the benefits of drilling in ANWR to increase our domestic oil supply.